

Interactive comment on “Comparative analysis of the actual evapotranspiration of Flemish forest and cropland, using the soil water balance model WAVE” by W. W. Verstraeten et al.

W. W. Verstraeten et al.

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Summary of the responses made

Given the nature of the comments of both Reviewers the authors opted to rewrite parts of the manuscript before going to Phase 2 of the review process.

As suggested by Reviewer #1 and #2 the Richards equation was removed and Fig. 1 was replaced by a set of equations outlining the way ET_0 , ET_c , E_p , T_p , E_{act} , T_{act} and ET_{act} were calculated. This allowed also explaining the physical meaning of the parameters included in the analysis. Since Reviewer #1 requires adding more discussion on the results this section was extended. To improve the structure of the manuscript subheadings were added in Section 3.3 (“Water balance in relation to forest stand characteristics”). Where possible, the “grey literature” was replaced with references to

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international papers.

First the comment of the reviewer is given, next our answer (ANSWER:)

Specific comments

p.2/sec 1: is ET_act the water consumption (WU) or water use (WU) of the previous lines; see also Fig.4 (and 5).

ANSWER: To avoid confusion the term “water use” and no longer “water consumption” is being used in the manuscript. The water use is defined as the total water evaporated to the atmosphere by transpiration, soil and canopy interception evaporation and thus is equal to ETact. We also used the term “water use components” indicating Tact, Eact and interception, respectively.

p.4/5: are eq (1) and (2) both necessary? Also theta is introduced (p.4) before explained (p.5).

ANSWER: Both equations were deleted and the model description section was modified as to accommodate those comments.

p.6/sec 2.2: Is SMC the same as theta?

ANSWER: Yes, they are the same and in the manuscript only SMC is used for soil moisture (water) content.

p.7: There is no point in using both ME and CD. Although the statistical definition/meaning may differ, for analytical purposes they are directly related $ME=1-1/CD$. Using either one is just as good and may yield a clearer presentation of results in section 3, and simplify table 1.

ANSWER: We believe that ME is not directly related to CD as suggested. In verifying the suggested relation we were not able to derive this relation. In the CD formula the average of the observations (\bar{O}) is both in the denominator and the numerator, while in the ME formula \bar{O} is only in the numerator. However, there is a relation between CD

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and ME and RMSE which is more complex and given hereunder:

$CD = (\sum(O_i - \bar{O})^2) / (\sum(P_i - \bar{O})^2)$; or $CD = MSE / (1 - ME) / stdev$; with $stdev = \sum(P_i - \bar{O})^2$; \bar{O} is the average of the observations: O_i is the observation i : P_i is prediction i .

Do you still judge to leave out CD for better presentation of the results in Section 3.?

p.12: I do not understand the meaning of the term 'previous' p.13 last para: the term 'previous' again p.15 2nd para: the term 'previous' again

ANSWER: The related sentences were rephrased.

p.19: l. -7: interception _evaporation_ seems more likely

ANSWER: We could not find this comment in the manuscript (some page numbers do not correspondent).

Technical/editorial:

p.5: _Bosch_ and Hewlett (1982)

ANSWER: OK!

p.5: "...in southern Britain was lower than _that_ of grassland."

ANSWER: OK!

p.8/l.2: the last one should be $K(\theta_s)$

ANSWER: OK!

p.9: (Klute, 1996) ??

ANSWER: Must be 1986.

p.11: (SAS Institute inc. 1989) ??

ANSWER: Must be 1992.

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p.12 Van Keulen (1982) not in refs

ANSWER: The list of references 1992 is given, which should be replaced by 1982.

p.13 1st para l.1: "... 2 m _below_ the soil..."

ANSWER: OK!

p.13 1st para l.7: "...model was _then_ used to..."

ANSWER: OK!

p.20 l. -6: replace 'previous' by 'former'

ANSWER: OK!

Fig. 1: needs consistent typeface for text

ANSWER: We omitted this figure as suggested by Reviewer #1.

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